Promoting Sustainability in the Inyo-Mono Region: Understanding Regional Groundwater Resources and Upgrading Infrastructure in Disadvantaged Community Water Systems

Attachment 6: Monitoring, Assessment, and Performance Measures

Introduction

The following pages contain information and tables describing monitoring, assessment, and performance measures for each of the four projects included in this proposal. In addition to the individual project performance monitoring plans, a program-wide Performance Monitoring Plan will be prepared for all projects to be implemented under the grant award. This document will be a compilation of project-specific performance monitoring plans and will, for each project, identify the problem to be addressed by the project, summarize the project tasks, specifying the project goals and desired outcomes, and include a project performance measures table presenting output and outcome indicators, measurements tool and methods to be implemented and performance targets. This plan will be developed by Inyo County (the grantee) and the Inyo-Mono IRWM Program Office, in collaboration with project proponents, within the first quarter after the execution of the grant agreement.

The Performance Monitoring Plan will help to ensure that the Inyo-Mono IRWM Phase II Plan is being implemented and is achieving its objectives through the implementation of projects (Phase II Plan Chapter 12). In addition to project-specific performance information, the programmatic Performance Monitoring Plan will evaluate the success of the four projects in addressing the Inyo-Mono regional objectives and resource management strategies. This plan will help the RWMG to address Inyo-Mono IRWM Plan Performance and Monitoring standards through the development of administrative, output, and outcome indicators as outlined in Phase II Plan Chapter 13.

Big Pine Fire Protection Improvement Project

Project Summary

The Big Pine Paiute Tribe of the Owens Valley (BPPT) and the Big Pine Community Services District (BPCSD) are integrating fire hydrant water infrastructure needs to improve fire protection on the reservation and the adjacent town. This project will replace 38 hydrants on the BPPT public water system which have reached the end of their useful life, or for which hydrant parts are no longer available for purchase. In addition, this project will install four new hydrants to the BPCSD water system, as well as replace one antiquated hydrant. Wildfire and isolated residential fires have caused extensive destruction of homes and other property within both communities over the past decade. The implementation of this project will provide needed infrastructure upgrades for improved access to water at fire hydrants to assist the local volunteer fire department and other fire agencies in extinguishing fires within the two communities. Further, the project provides needed assistance and resources to a disadvantaged community (BPPT) and a small, rural water district (BPCSD).

Monitoring

The project will be implemented by a two member force account team with oversight by the Tribal Utility Operator and Tribal Administrator. The project will consist of removing the old fire hydrants and associated material and installing new fire hydrants. A total time of eight months will be required to complete this project. During the project, reports will be given on a quarterly basis showing progress, deficiencies, expenditures and any additional information required for grant administration. A final report will be produced at the end of the project to summarize results and cost.

Assessment

The fire hydrants installed as a part of this project will be tested and verification will be made that they operate as intended prior to the end of the project. In addition, an annual hydrant flushing program will be initiated after the completion of the project to ensure that hydrants are kept in good working order for optimal life expectancy.

Residential Fire Structure Loss Data will be evaluated following a ten year period to determine the cost benefit of this project for the communities served. The evaluation will compare loss of residential structures due to fire from 2002-2012 and 2013-2023 in order to show the beneficial impact the project has made to the communities served.

In addition, Inyo-Mono IRWM Program Office staff will evaluate how this project helps to implement the Inyo-Mono IRWM Plan.

Performance Measures

Project Goal	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Increase fire protection capacity in Big Pine, CA	• Improved emergency water system infrastructure for Big Pine Paiute Tribe and Big Pine Community Services District • Reduced residential structure loss from fire • Increased communication between BPPT and BPCSD for future collaboration	• Installation of 43 functional fire hydrants • Ninety percent reduction in residential structure loss as compared to last 10 years • Semi-annual meetings between BPPT Council/staff and BPCSD Board/staff	• Number of structures destroyed by fire • Number of collaboration meetings convened	• Data on residential structure loss from fire; data from before and after project construction will be compared for a ten-year period on either side • Meeting minutes

Amargosa Basin Water, Ecosystem Sustainability, and Disadvantaged Communities Project

Project Summary

The hydrology of the Wild and Scenic Amargosa River and the underlying groundwater basins is complex and remains little studied, yet these systems are the sole source of water supporting the unique flora and fauna, as well as two severely disadvantaged communities, of the region. Over the past five years, collaborative studies funded by the Amargosa Conservancy, The Nature Conservancy, USGS, BLM, and Nye and Inyo Counties have made significant progress in understanding this groundwater-dependent system. The timing and need for additional work is of critical importance—the solar renewables industry is planning to site numerous utility scale plants in the bi-state Amargosa River drainage that will rely on groundwater in the already over-allocated groundwater basin, and the BLM is developing a Wild and Scenic River Comprehensive Management Plan for California Amargosa River reaches where perennial flow supports a wide variety of rare and sensitive species. Given the existing pressures on the water resources of the Amargosa Basin from urban and agricultural users, it is critical that the work in this project be completed at the earliest possible time. This request for funding will allow the expansion and continuation of this vital work to ensure that the groundwater system can be adequately understood and protected, renewables facilities are adequately sited and mitigated, and the BLM's plan asserts rights to the river and groundwater needed to protect this unique desert ecosystem. Furthermore, this project is part of a larger effort in the Inyo-Mono IRWM region to better understand the location and nature of groundwater supplies in order to inform sustainable groundwater management. The proposed work:

- Provides data critical to the development of a conceptual model of the groundwater basin;
- Provides a monitoring well network that enhances our understanding of the basin, provides a monitoring well network needed to establish baseline hydrologic conditions; and provides an early warning monitoring network to identify impacts to the groundwater basin before they impact sensitive resources; and allow the County to comply with mandates of the state to monitor Amargosa Groundwater Basin; and,
- Provides funding for the continuation of ongoing monitoring for one year.

Monitoring

The project will be implemented and monitored by the Amargosa Conservancy and County of Inyo with assistance by the U.S. Geological Survey and a professional services firm to be determined who will conduct work under the supervision of a California Professional Geologist and Certified Hydrogeologist. The project will consist of installing nine new groundwater

monitoring wells including installing continuous water-level recording equipment and groundwater sampling and analysis, evaluating evapotranspiration (the principal groundwater discharge component in the area), and continued groundwater level, spring flow and Amargosa River flow monitoring. Assuming a 3rd Quarter 2013 starting time, all hydrologic work would be completed by the end of the 1st quarter of 2015 except for the evapotranspiration work which would be completed by the end of the 1st quarter of 2016. During the project, progress reports will accompany each invoice showing progress, deficiencies, expenditures and any additional information required for grant administration. A final State of the Basin Report will be produced at the end of the first quarter 2015 to summarize results and will include an addendum summary of costs. The evapotranspiration work being conducted by the U.S. Geological Survey will be reported in a stand-alone U.S. Geological Survey published report.

Assessment

All technical work will be conducted by a professional services firm to be determined under the direction of a California licensed geologist / hydrogeologist and by the U.S. Geological Survey. All laboratory analyses will be conducted by California certified analytical laboratory. Monitoring wells will be installed under permit by the Inyo County of Environmental Health Department with well seals inspected by County staff.

Hydrologic data gathered during this effort will be analyzed and reported in a State of the Basin Report to be prepared by the end of the first quarter of 2015 and in a standalone U.S. Geological Survey investigation report (regarding the evapotranspiration investigation).

In addition, Inyo-Mono IRWM Program Office staff will evaluate how this project helps to implement the Inyo-Mono IRWM Plan.

Performance Measures

Project Goal	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Provide for the long-term management of regional groundwater resources	• Robust hydrologic model of Amargosa River and underlying basins • Information to better inform proposed solar developments with respect to groundwater use • Compliance with CASGEM • More well-informed Wild & Scenic River Plan for Amargosa River	• Installation of nine monitoring wells • Three-season hydrologic monitoring events to include Amargosa River gaging at five locations, spring flow monitoring at key springs, and water level monitoring at new and existing monitoring wells • Groundwater quality analysis from nine new monitoring wells • Refined estimate of groundwater discharge by evapotranspiration (the principal discharge component) • Groundwater elevation data collection	• Well logs from well installations • Groundwater elevation data • Surface water gage data • Spring flow data • Groundwater quality data • Groundwater discharge estimates	• Monitoring well installation by California-licensed drilling contractor • Field water quality parameters monitored using YSI field parameter instrument or equivalent • Groundwater quality analysis performed by California-certified analytical laboratory • Water level monitoring at new and existing wells by continuous water-level recording equipment • Spring flow estimation based on site-specific conditions at each spring • River gaging using sonic flow meter / standard river gaging methods • Evapotranspiration estimation using evapotranspiration tower equipment; remote sensing methods, field inspection.

Inyo County Disadvantaged Communities Meters Project

Project Summary

Inyo County Department of Public Works oversees the operation of three water systems: Laws, Independence, and Lone Pine. Each of these communities is disadvantaged based on median household income data. The systems were acquired by Inyo County from the Los Angeles Department of Water and Power in 1999. All three systems are in need of significant infrastructure repairs and upgrades. This project will replace 950 old analog meters in the three communities with new digital meters as well as provide associated billing software and handheld meter reading devices. The old meters are suspected of under-reporting actual water use, so it is difficult to consider further improvements to the systems, such as rate increases, main line replacement, and so on, until there is an accurate record of water use.

Monitoring

The project will be implemented and monitored by Inyo County Department of Public Works staff and a professional services firm to be determined through a bid process. The project will consist of installing 940 new automatic meter reading meters in the communities of Laws, Independence, and Lone Pine, CA, along with new billing software and handheld meter reading devices. During the project, quarterly progress reports will be submitted to DWR showing progress, deficiencies, and changes. A report following the final inspection will be produced and provided to DWR. It is expected that the entire project will take approximately 15 months to complete.

Assessment

Project progress will be evaluated by Inyo County Department of Public Works, Inyo County (acting as the grantee), and DWR. In addition, Inyo-Mono IRWM Program Office staff will evaluate how this project helps to implement the Inyo-Mono IRWM Plan.

Performance Measures

Project Goal	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Help achieve effective and efficient management of the Laws, Independence, and Lone Pine water systems through the accurate metered consumption of water	• More accurate measurements of water use • Increased operational efficiency with respect to meter reading and billing • Baseline of water consumption to use in future rate study • Reduction of unaccounted-for water delivered to the systems but not billed for	• 950 meters installed • At least a 75% reduction in number of staff hours required for meter reading and billing	• Number of installed meters • Reduction in hours spent reading new meters and billing • Comparison of discrepancy between pumped water delivered to the systems and metered water use before project and after project	• Monthly water bills with amount of water used • Inyo County staff timesheets • LADWP annual well pumping data

Indian Wells Valley Groundwater Basin Brackish Water Resources Study

Project Summary

The Indian Wells Valley Water District (IWVWD) is located approximately 120 miles northeast of Los Angeles in the northern part of the Mojave Desert in an unadjudicated groundwater basin. The only source of water in the area is the local groundwater. Water extracted from the aquifer serves the City of Ridgecrest, town of Inyokern, and surrounding rural areas, and supplies the China Lake Naval Air Weapons Station. Total usage is about 30,000 acre feet of water per year (AFY), and IWVWD customers are responsible for about 25% of the total annual usage, or approximately 7,500 AFY. The water budget developed for the basin indicates an estimated annual ground water recharge shortfall (overdraft) of roughly 21,000 AFY in the Indian Wells Valley groundwater basin.

The current water portfolio and local conservation efforts include tiered water rate structure, several water conservation ordinances, public water conservation education, recycled water use, and investigating water importation. However, these efforts do not provide sufficient water to meet the future needs of the Indian Wells Valley or offset the current groundwater pumping. Brackish groundwater identified through the Brackish Water Resource Study would help meet the future water needs of the IWVWD and others in the Valley. This project will evaluate the potential for a new water supply to be developed from brackish groundwater through a review of previous studies completed in the groundwater basin, identification of existing data gaps, addressing data gaps, and updating the basin model to better understand the spatial distribution and quality of brackish water. This knowledge would improve water source reliability for the basin and would also become the basis for future decision-making activities associated with ensuring a reliable local water supply.

Monitoring

The District's Chief Engineer will be monitoring the progress of the Project through a project tracking sheet which will allow for overall tracking of potential issues and monitor progress of consultant(s), quality of deliverables, etc. The consultant(s)' adherence to timeline and budget will be an indicator of performance. In addition, the consultant(s)' adherence to tasks and agreed upon scope of work, as well as thoroughness and quality of work products will also be used to evaluate project performance. Monthly progress meetings will be held with the consultant(s) in order to receive updates and keep all involved on task. Quarterly progress reports as well as a final report will be provided as required in a timely manner to DWR.

Assessment

The IWVWD Chief Engineer will evaluate all output from consultants, including progress reports, the Technical Memorandum (Task 5) and the Final Report and associated deliverables (Task 8).

In addition, Inyo-Mono IRWM Program Office staff will evaluate how this project helps to implement the Inyo-Mono IRWM Plan.

Performance Measures

Project Goal	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Evaluate the potential for a new water supply to be developed for the Indian Wells Valley in an environmentally-sound way	• Delineation of the vertical and lateral distribution, and the quality, of brackish water in the IWV basin • Refined groundwater basin conceptual model that includes brackish and fresh water distribution • Improved understanding of groundwater recharge in the basin • Improved understanding of the volume of potable and brackish water to compare against future water demand scenarios • Location of potential construction sites for full-scale brackish water treatment facility	• Review of previous studies on groundwater in the basin • Identification of data gaps based on literature review • Updated groundwater basin conceptual model and groundwater flow model • Identification of vertical and lateral distribution, as well as quality, of brackish water	• Improved information on location and quality of brackish water in the IWV groundwater basin • Revised and improved: (a) groundwater basin conceptual model and (b) groundwater flow model • Knowledge necessary to develop alternative scenarios with respect to the construction of a brackish water treatment facility	• Final report containing: results of steps taken to address data gaps and acquire information; updated groundwater basin model; maps showing vertical and lateral distribution, as well as quality, of brackish water; and recommendations for development of brackish water supply